

REMARKS

Claims in the case are 1, 3 and 5, upon entry of this amendment. Claim 1 has been amended, and Claims 4, 6 and 7 have been cancelled herein without prejudice. Claims 2 and 8-25 were previously cancelled without prejudice in an Amendment dated 14 September 2004, pursuant to a Restriction Requirement (dated 1 October 2003) and an Election (dated 30 December 2003).

Claim 1 has been amended herein to include the subject matter of Claim 4 (i.e., the refractory metal plate comprises at least 99.99% tantalum). Accordingly, Claims 4, 6 and 7 have been cancelled without prejudice herein.

Applicants note with appreciation the withdrawal of the rejection of Claims 1-5 under 35 U.S.C. §102(e) as being anticipated by United States Patent No. US 6,348,113 B1 (**Michaluk '113**).

Applicants also note with appreciation the withdrawal of the rejection of Claims 1-7 under 35 U.S.C. §102(b) as being anticipated by International Publication No. WO 99/66100 (**Shah et al**).

Applicants further note with appreciation the withdrawal of the rejection of Claims 1 and 3 under 35 U.S.C. §102(b) as being anticipated by JP 2000-104164 (**Fujioka et al**).

Claims 1-5 stand rejected under 35 U.S.C. §102(e) as being anticipated by United States Patent No. 6,331,233 B1 (**Turner**). This rejection is respectfully traversed with regard to the amendments herein and the following remarks.

Turner discloses that the tantalum targets prepared by his method have "uniform, predominantly {111} <uvw> texture throughout the target thickness." See column 2, lines 52 - 58 of Turner. The term "uniform texture throughout the target thickness" is defined by Turner as referring to a homogenous distribution of textural components with no visible banding from the target surface to at least mid-thickness. See column 2, lines 58-61 of Turner.

Turner purports to disclose tantalum sputtering targets that have uniform {111} texture through the thickness of the target. However, the method disclosed by Turner does not result in the formation of tantalum sputtering targets that have uniform {111} texture (or uniform {100} texture) through the thickness of the target. In particular, the method disclosed by Turner does not result in the formation of a

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refractory metal plate having a distribution of {100} and {111} crystallographic orientations that varies by less than 30 percent across any thickness of said refractory metal plate.

Attention is directed to the declaration, which is included in the appendix herewith. The declaration provides the results of texture analysis of a round tantalum plate that was prepared in accordance with the method disclosed by Turner. From a mere visual evaluation of the map of textures through the thickness of the round plate, it can be seen that a plate prepared in accordance with the method described by Turner does not have uniform 111 orientations or uniform 100 orientations there-through. In addition, a further analysis of horizontal slices of equivalent dimension across the thickness of the plate (made in accordance with the disclosure of Turner), as summarized in Table 1 of the declaration, clearly shows that the distribution of 111 and 100 orientations vary by more than 30% across the thickness of the plate.

In light of the preceding discussion, and the data of the declaration included herewith, Turner's disclosure is not enabling with regard to providing a method of preparing a tantalum target that has uniform {111} and/or {100} crystallographic orientations through the thickness of the target. In addition, Turner's disclosure is not enabling with regard to providing a refractory metal plate having a distribution of {100} and {111} crystallographic orientations that varies by less than 30 percent across any thickness of the plate. In light of Turner's failure of enablement, the disclosure of Turner is not deemed to reach or touch upon the subject matter of Applicants' present claims. Turner's disclosure of "uniform, predominantly {111} <uvw> texture throughout the target thickness" is deemed to be at most generic, and does not reasonably amount to a disclosure or suggestion of the refractory metal plate of Applicants' present claims.

Applicants further submit that the process disclosed by Turner necessarily results in tantalum sputter targets that have a different strain history between the center and outer edges of the target, as would be recognized by a skilled artisan. This differential strain is introduced into the target during Turner's stage-2 deformation step. During Turner's second deformation stage, the edge area of the target / plate is subjected to a moderate level of strain; while the center area is

subjected to a relatively low level of strain near the upper and lower surfaces of the plate, and a high level of strain in the interior (mid-thickness) of the plate. Such a disparity in strain can not be sufficiently homogenized by annealing, rolling or re-annealing, and as such necessarily results in a non-uniform texture from the center to the edge of Turner's sputtering targets, as would be recognized by a person of ordinary skill in the art. See column 3, lines 49 through column 4, line 26; and Table-1, columns 5 and 6 of Turner. In addition, the disparity in strain resulting from the method by which Turner prepares his sputtering targets also results in a non-uniform texture from the surface to the mid-thickness of the target, as discussed previously herein with reference to the declaration included herewith.

As such, Turner provides no disclosure, either expressly or inherently, with regard to a tantalum sputtering target having uniform 111 and/or 100 crystallographic texture from the center to the edge of the target. In particular, Turner provides no disclosure with regard to a tantalum sputtering target having 111 and 100 texture that is uniform both through the thickness of the target and at the same time from the center to the edge of the target.

Further, Turner discloses that the sputtering targets prepared by his method have strong {111} textures with a **random** distribution of {100} textures. See column 4, lines 44-46 of Turner (emphasis added).

The refractory metal plate of Applicants' claims necessarily has a **uniform** distribution of {100} and {111} crystallographic orientations. More particularly, the refractory metal plate of Applicants' claims has: (i) a distribution of {100} and {111} crystallographic orientations that varies by less than 30 percent across the surface of any plane of said refractory metal plate, wherein such planes are orthogonal to the thickness of the refractory metal plate; and (ii) a distribution of {100} and {111} crystallographic orientations that varies by less than 30 percent across any thickness of said refractory metal plate.

Turner provides no disclosure with regard to tantalum sputtering targets or refractory metal plates having a distribution of {100} and {111} crystallographic orientations that varies by less than 30 percent across the surface of any plane that is orthogonal relative to the thickness of the target / plate. Further, Turner provides no disclosure with regard to tantalum sputtering targets or refractory metal plates

having a distribution of {100} and {111} crystallographic orientations that varies by less than 30 percent across any thickness of the target / plate.

In light of the amendments herein and the preceding remarks, Applicants' claims are deemed to be unanticipated by and patentable over Turner.


Reconsideration and withdrawal of this rejection is respectfully requested.

Claims 1-3 and 6-7 stand rejected under 35 U.S.C. §102(e) as being anticipated by United States Patent Application Publication No. US 2002/0072475 A1 (**Michaluk '475**). This rejection is respectfully traversed with regard to the amendments herein and the following remarks.

The present rejection does not include the subject matter of Claim 4. Claim 1 has been amended to include the subject matter of Claim 4, and Claims 4, 6 and 7 have been cancelled herein without prejudice. As such the present rejection is deemed to be moot. Reconsideration and withdrawal of this rejection over Michaluk '475 is respectfully requested.

In light of the amendments herein and the preceding remarks, Applicants' presently pending claims are deemed to define an invention that is unanticipated, unobvious and hence, patentable. Reconsideration of the rejections and allowance of all of the presently pending claims is respectfully requested.

Respectfully submitted,

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APPENDIX

Declaration of Mr. Peter R. Jepson, under 35 U.S.C. § 132.